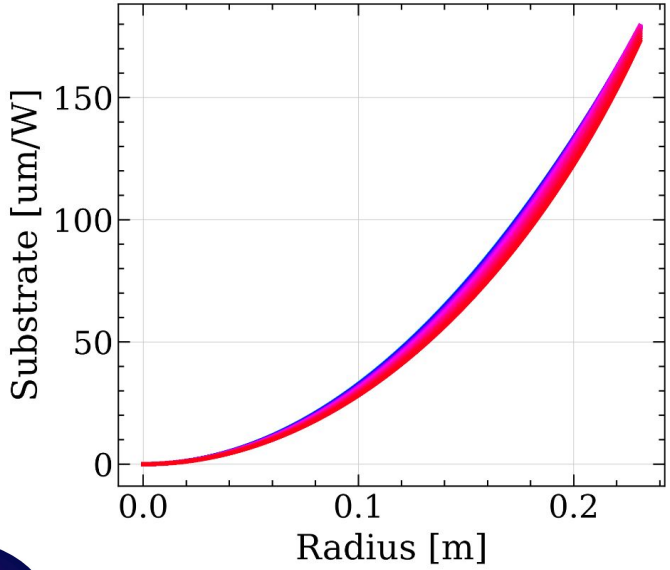
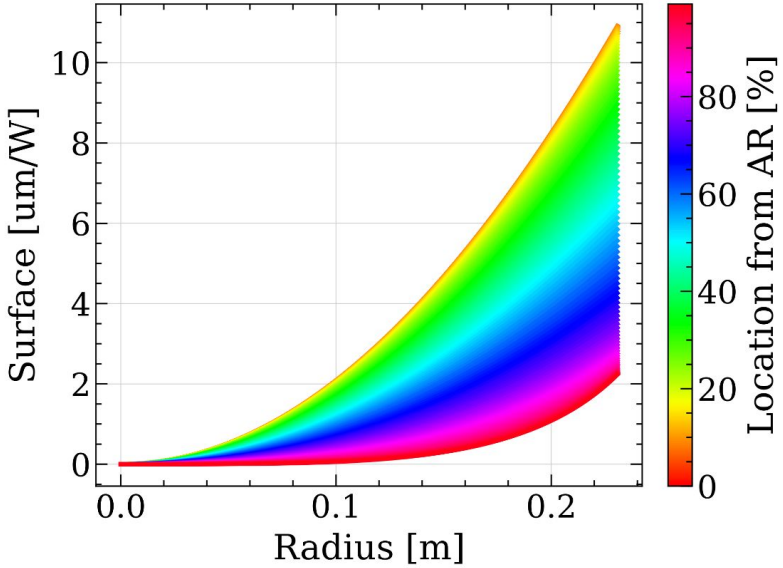
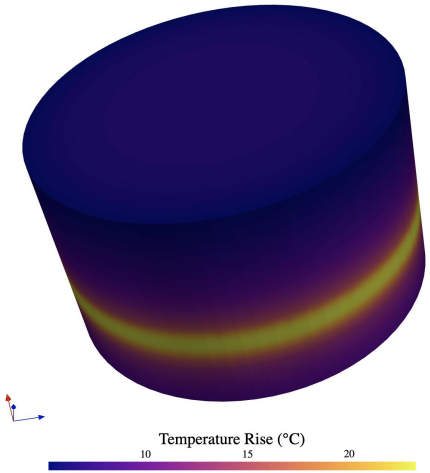
Ring Heater Continued

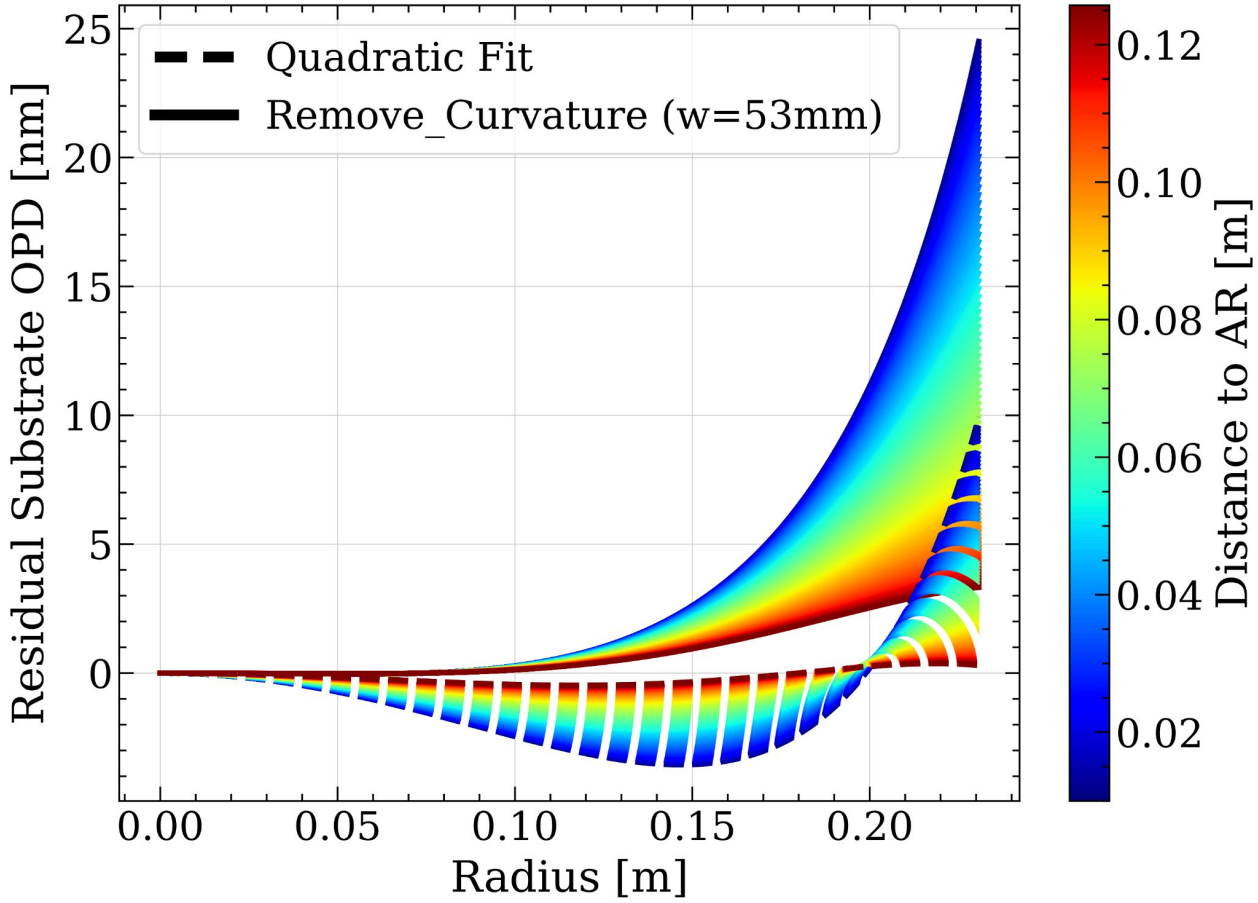
Ring heater location on the **surface** and **substrate** actuation gains





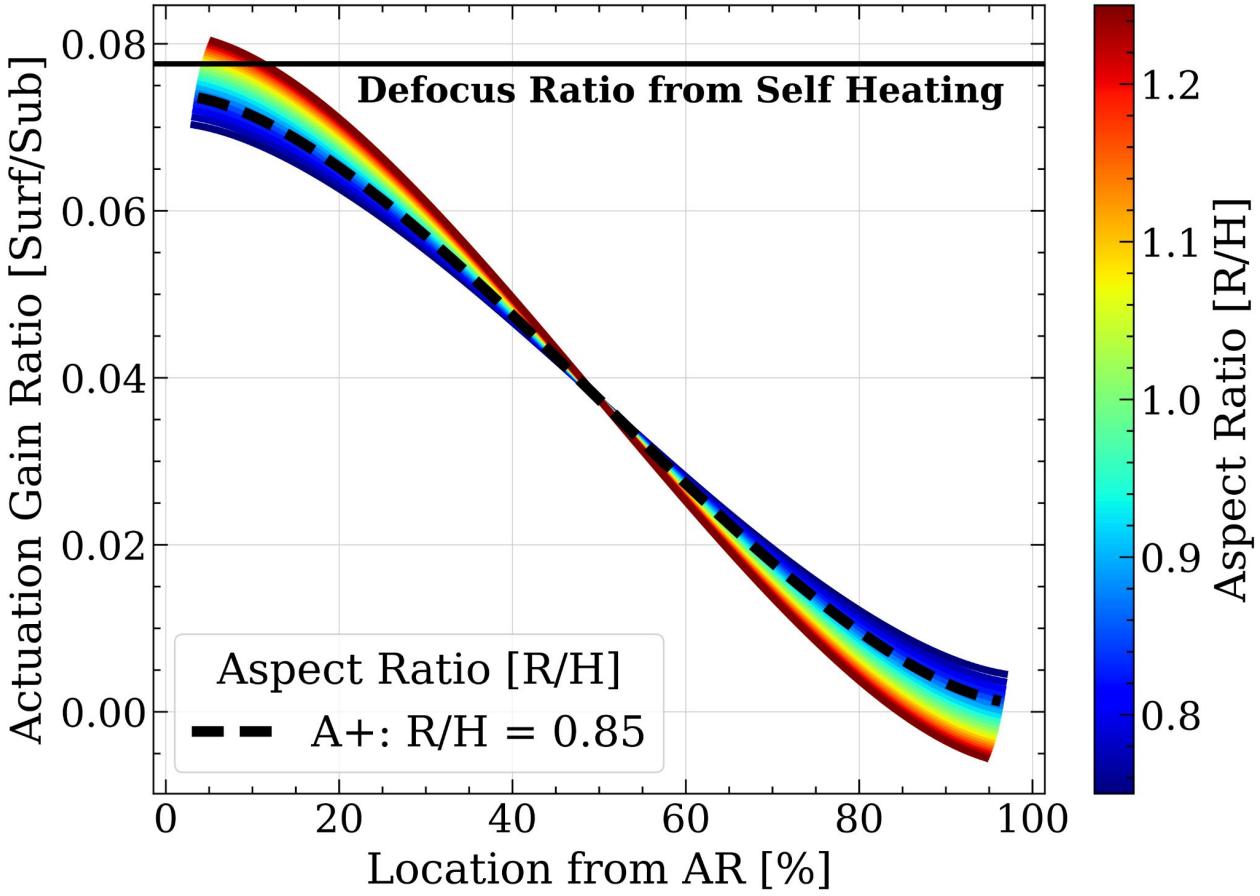


1. The substrate OPD is not sensitive to the RH location.
2. The surface OPD varies significantly. The closer to the AR, the larger the actuation gain.

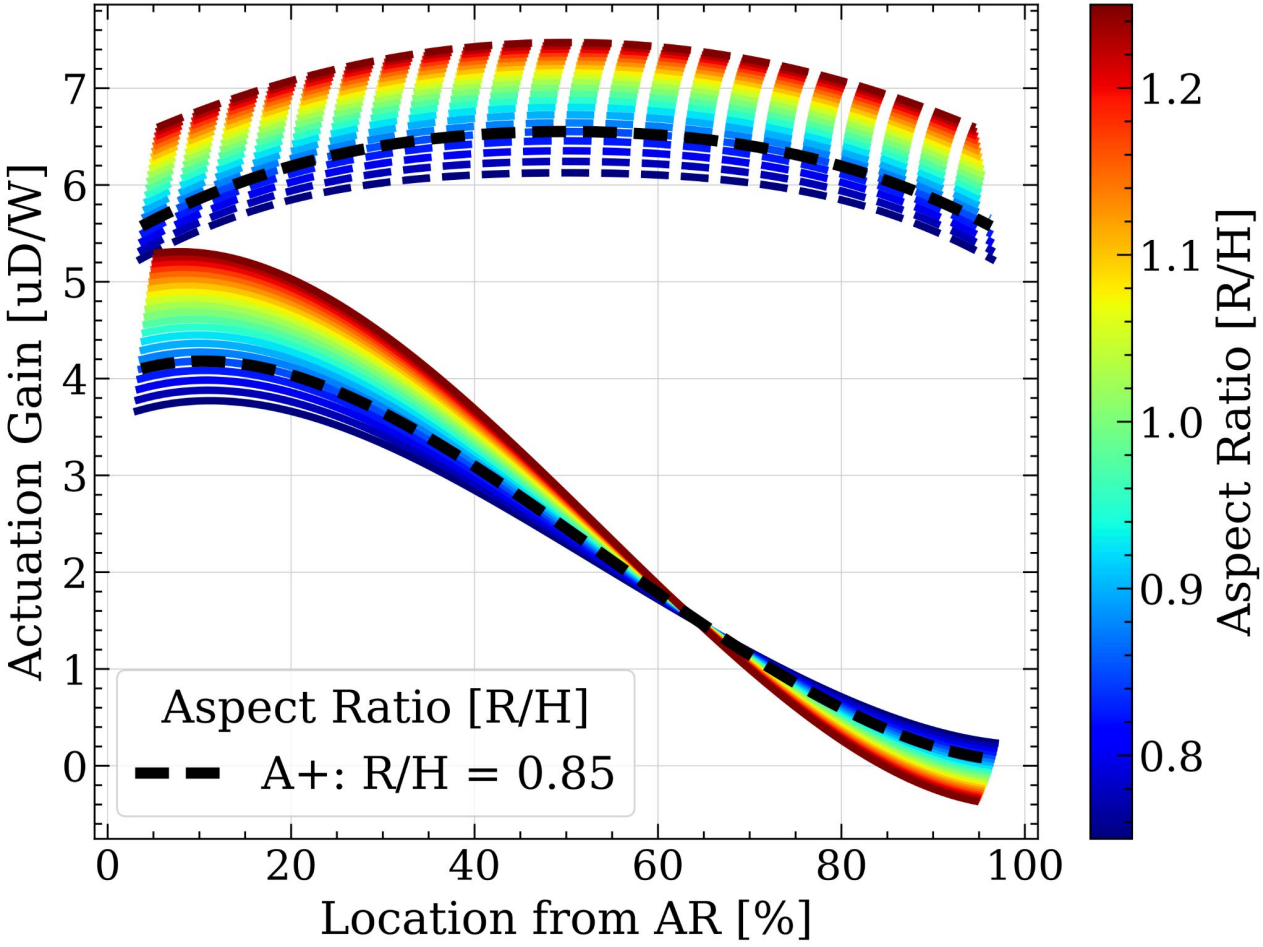


Comparison of the residual substrate OPD after removing curvature

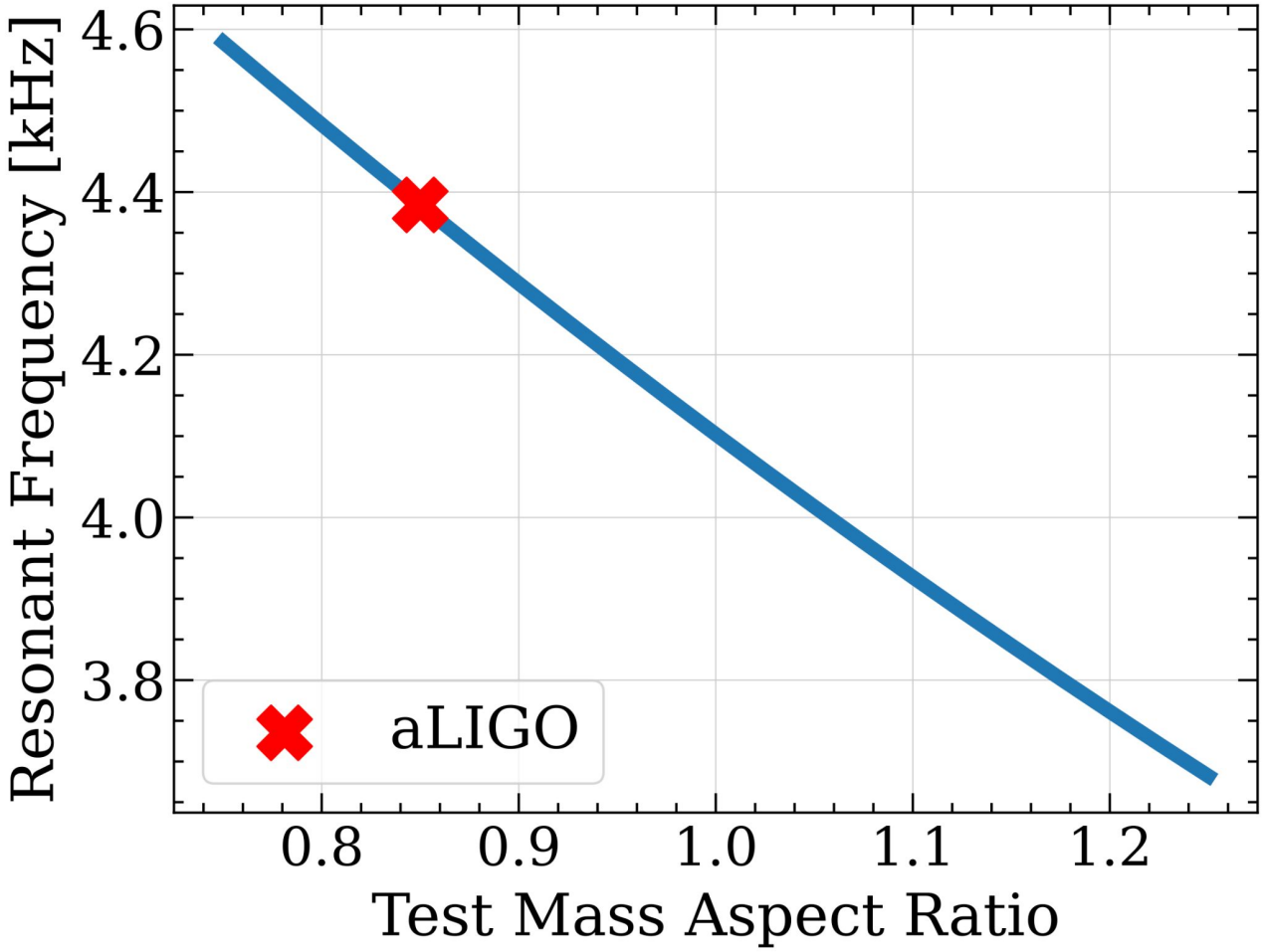
Quadratic fit seems to be more accurate than remove curvature with beam size weighted

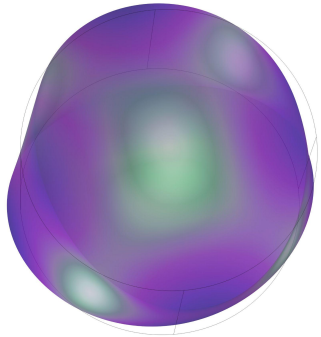


Reducing the TM height H (increasing aspect ratio R/H, keeping radius R fixed) increases the actuation gain ratio to match the target defocus ratio from self heating.

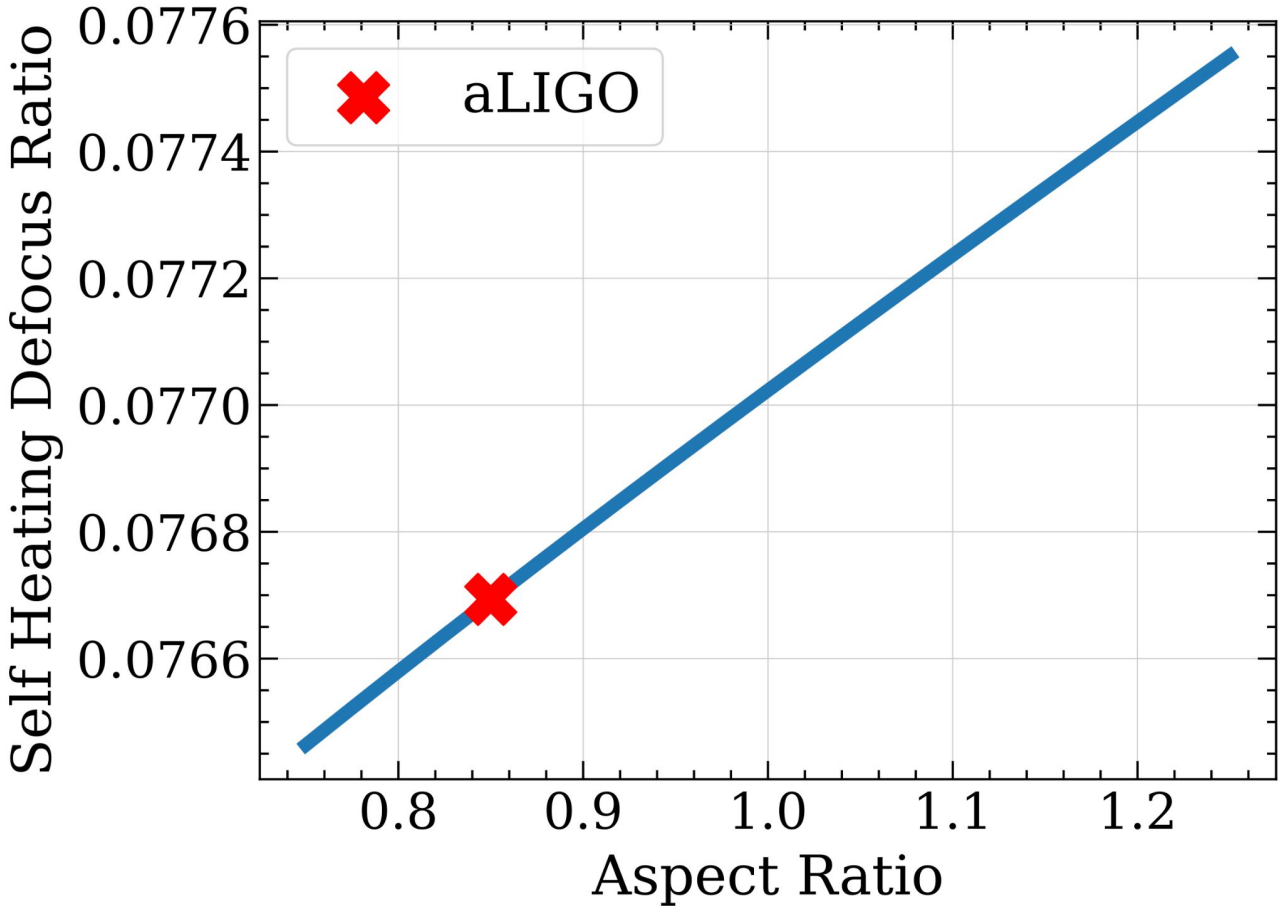


The surface and substrate quadratic actuation gain when reducing the TM height (increasing aspect ratio R/H)



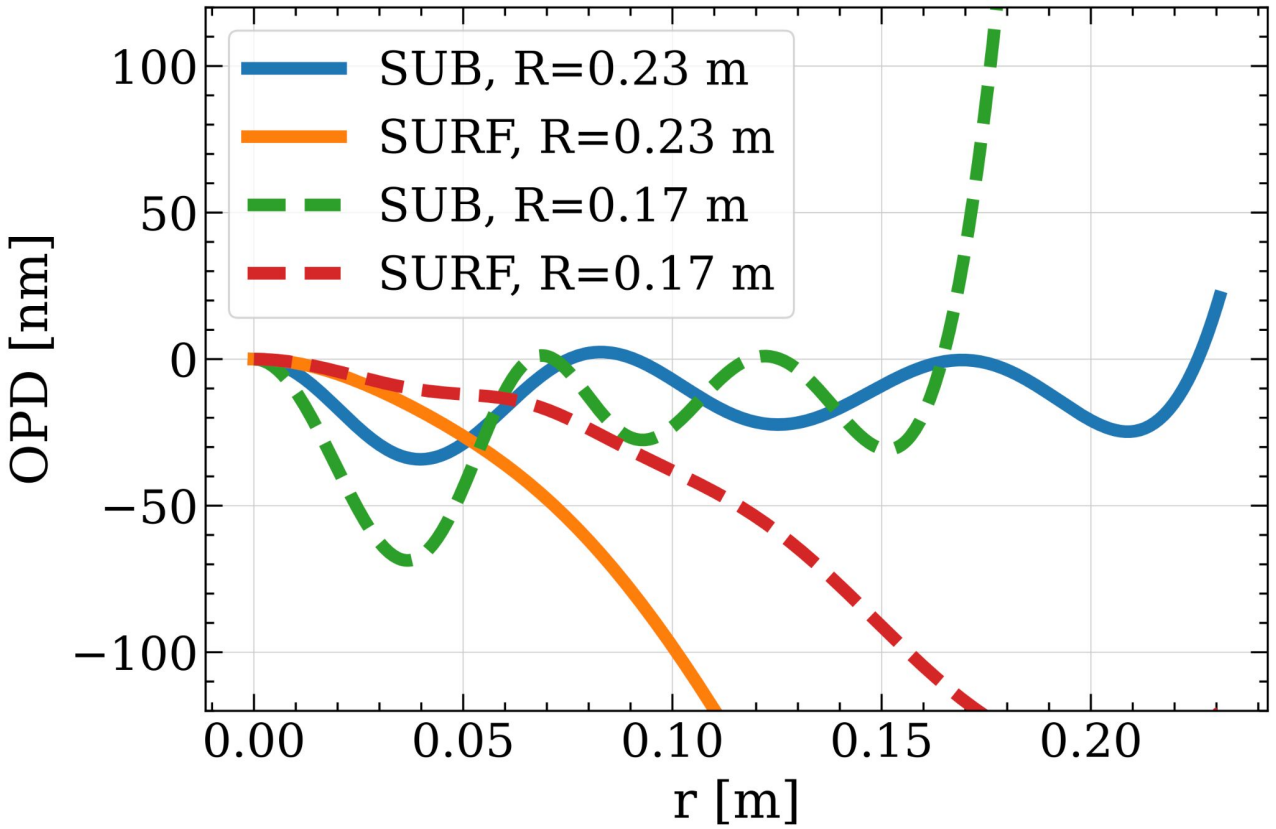


Mechanical resonance frequency decreases as the height of the test mass decreases (increasing aspect ratio R/H)



The target self heating defocus ratio increases as the height of the test mass decreases (increasing aspect ratio R/H)

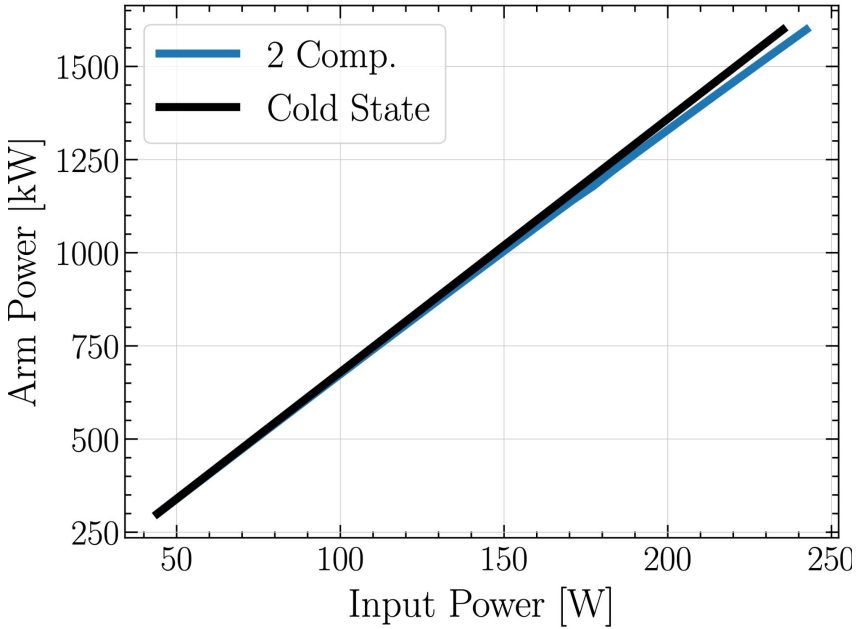
Residual wavefront error for substrate and surface

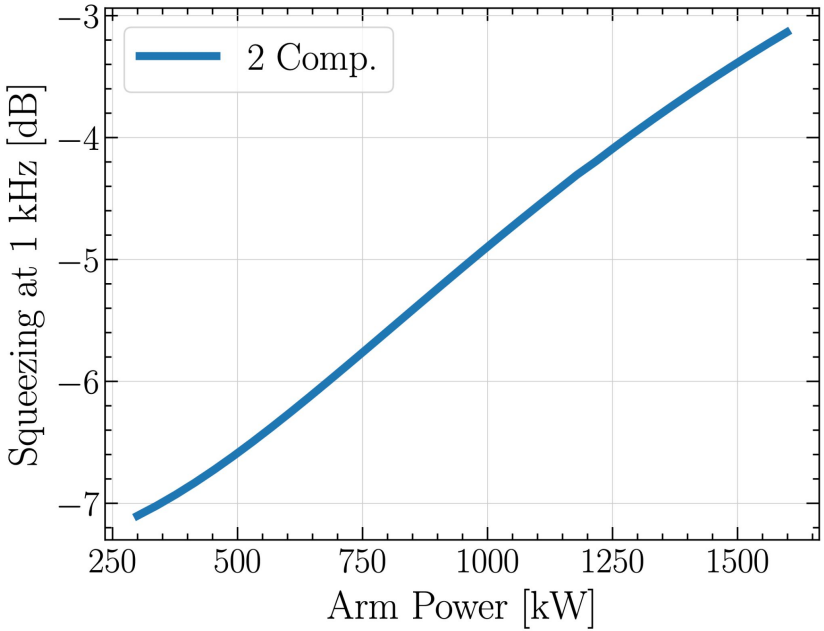


By setting the region of interest to be 0.17 m instead of the entire radius of 0.23 m for A# test mass, we are able to lower the residual surface error significantly.

This is at the expense of larger substrate error at both small and large radii.

Preliminary result on IFO performance (only ITM distortions)





Arm power buildup seem to perform well, but squeezing degrades a lot, most likely due to the substrate residual